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ABSTRACT

The labor force participation rate of married women first declines and then rises as countries develop. Its U-shape is revealed both across the process of economic development and through the histories of currently advanced economies. The initial decline in the participation rate is due to the movement of production from the household, family farm, and small business to the wider market, and to a strong income effect. But the income effect weakens and the substitution effect strengthens at some point. This paper explores why the change takes place and why the U-shape is traced out. When women are poorly educated their only wage labor outside the home and family farm is in manual work, against which a strong social stigma exists. But when women are educated, particularly at the secondary level, they enter white-collar work, against which no social stigma exists. Data for more than one hundred countries and for United States history are used to explore the hypothesis of the U-shaped female labor force function.

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"It is open to men to debate whether economic progress is good for men or not, but for women to debate the desirability of economic growth is to debate whether women should have the chance to cease to be beasts of burden, and to join the human race."

W. Arthur Lewis, The Theory of Economic Growth (1955)

Gender equality and economic development share a synchronous existence. Gender equality is a spur to economic development, particularly where the well-being of children is concerned, and economic development, as the headnote graphically suggests, fosters gender equality.

It is the relationship from economic development to greater gender equality that is explored here. I examine the roles played by education and the emergence of a white-collar sector in fostering the paid employment of married women. The movement of women from the home to the work place promotes various types of gender equality both in society at large and in the home, although the process has been protracted in a number of countries. Women's changing status across economic development can be studied in the histories of developed economies and through a cross-section of the world's economies. The historical case used here is the United States over the past century, and the cross section is a data set of more than one-hundred countries.

Across the process of economic development adult women's labor force participation rate is U-shaped. When incomes are extremely low and when certain types of agriculture dominate (for example, poultry, dairy, rice, cotton, peanuts; generally not grains, livestock, tree crops, sugarcane), women are in the labor force to a great extent. They are sometimes paid laborers but more often unpaid workers on family farms and in household businesses, often doing home workshop production. As incomes rise in most societies, often because of an expansion of the market or the introduction of new technology, women's labor force participation rates fall. Women's work is often implicitly bought by the family, and women then retreat into the home, although their hours of work may not materially change. The decline in female labor force participation rates owes, in part, to an income effect but it may be reinforced by a reduction in the relative price of home produced

goods and by a decrease in the demand for women's labor in agriculture. Even when women's relative wage rises, married women may be barred from manufacturing employment by social custom or by employer preference.

But as female education improves and as the value of women's time in the market increases still further, relative to the price of goods, they move back into the paid labor force, as reflected in the move along the rising portion of the U-shaped curve. The process suggests an initially strong income effect combined with a small own-substitution effect.[1] At some point the substitution effect increases while the income effect may decline. During the falling portion of the U the income effect dominates, but during the rising portion of the U the substitution effect dominates. I will address how the substitution effect comes to dominate and what relationship exists between the income and the substitution effects.

The notion that economic development enhances gender equality is not, I know, shared by all (see, for example, Norris 1992 for a model of immiseration). Nor is it universally agreed that a movement toward gender equality, as expressed for example in greater female schooling, causally enhances economic development. But I believe both notions are valid for the vast majority of countries and economies at least in certain ranges of economic development. In many cases the reason for the controversy regarding the first line of causality -- running from economic development to greater gender equality -- concerns the U-shaped relationship between economic development and female labor force participation. Movements along the declining portion of the U may lead to the immiseration of women. But those along the rising portion generally do not.

Central to understanding the relationship between the economic status of women and economic development is isolating the factors that cause the U-shaped function to change direction and rise with economic development, rather than fall. A further issue is what meaning increased labor force participation outside the home has in the lives of the world's women. Factors will vary from country to country, but there is considerable evidence that as women's work moves out from the home and family, even if such work was previously market-oriented, women gain freedoms in

the polity, in the society, and in their own households.[2] The relationship is far from perfect, and in some cases political freedoms actually occurred decades before economic change was apparent. But the relationship does appear to exist. There is also the issue of decision-making in the household. We know little about how resources are divided within the home, particularly among households in the richer nations of the world. We do know, however, that when women have the capacity for economic independence, they generally make more decisions within the household and control more resources (see, for example, Thomas 1990).

The first issue to address is the general U-shaped relationship between economic development and women's labor force participation. An uncomplicated graphical model of household and market production guides the discussion of the factors accounting for the U shape. Data on about a hundred countries are examined to establish the relationship between women's labor force participation and economic development, and among female education, the clerical sector, and economic development in cross-section. The historical record for the United States since 1890 provides evidence concerning the transition to the upward portion on the U. Finally, I return to the large cross section of countries to explore the relationship between economic history and economic development in terms of women's economic role and status.

1. Economic development and the U-shaped female participation rate function

1.1 The U in cross section

Several students of economic development have made reference to a U-shaped relationship between women's labor force participation rate and economic development (for example, Durand 1975, Psacharopoulus and Tzannatos 1989, although see Schultz 1991, on the distinction between wage and non-wage labor). The association between the two can be seen in Figure 1, which graphs the participation rate of women 45 to 59 years old against (log) per capita GDP (1985 $), where all variables are for c. 1980.[3] Per capita GDP may not be the best variable to proxy economic development, and the relationship also graphed in Figure 2 using the number

of years schooling of the male population over 25 years old, also for c. 1980. Each graph contains the regression line from a simple quadratic equation.[4]

I should acknowledge at the outset that the data come from the work of many other researchers. The education data are from Barro and Lee (1993), the GDP/capita (1985 $) data are from Summers and Heston (1991), and the female labor force participation rates are from the extensive United Nations WISTAT collection (United Nations 1992), as are additional data, used below, on sectoral or occupational shares.[5] It should also be noted that the definition of employment varies across the countries but it generally includes unpaid family farm workers, those in family businesses, and own-account traders.[6]

The general contours of the diagrams are not decidedly different when one of the younger age groups -- 25 to 44 years old -- is graphed.[7] The lower-aged group, however, contains many unmarried women, particularly at the younger ages, and women whose fertility decisions also impact their labor force decisions. The older age group is preferred for various reasons, although it, too, presents problems. The older group will contain widows and abandoned women, and thus not fully reflect the determinants of female labor force participation I would like to isolate. There is yet an additional problem presented by the older age group. I would like to see if educational advances and structural change in the economy are later reflected in the female participation rates. But these changes would first impact young, single women. For the employment decisions of the older age group to reveal changes in schooling levels would mean that the educational advances would have had to occur some twenty to thirty years before. Many of the countries of the world, even those in the poorer category, have witnessed substantial advances in education (see the essays in King and Hill 1993a, for example). But these advances have been somewhat recent in origin for the developing world.

One final point about the participation rate data concerns the differentiation among the labor force by employment status and by sector. Various researchers have noted inconsistencies in the definition of the labor force across the world's countries and have emphasized the need to

separate employment into wage, unpaid family, and self-employed workers (see, for example, Schultz 1990, 1991). Most of the countries reporting labor force data in WISTAT include all three sectors, although there are some inconsistencies (see notes to Figures 1 and 2). Schultz (1991) reports that the U cannot be observed for any one sector. Employment in unpaid family work and among the self-employed decreases with economic development, and the percentage in wage labor is fairly constant until much later stages of economic development when it rises. Thus the U is traced out by changes in the sectoral composition of the labor force.[8]

Few regions of the world have incomes and educational attainment that span a very wide range. The U-shaped function in Figures 1 and 2 is generally traced out by the regions, rather by the countries within them. Beginning at the upper left of each of the graphs and stretching somewhat down the function are East, Middle, and West Africa. Below them and somewhat to their left are North Africa and South Asia. Just to the right of and somewhat below East, Middle, and West Africa are South Africa and South East Asia. These seven poorer regions comprise most of the downward portion of the graph. At the bottom and into the beginning of the rising portion are South America and Central America. The upward bend starts with southern Europe, somewhat above it is East Asia, then western Europe, northern Europe, North America, and parts of the Pacific. There are outliers in various regions, but most the groupings are fairly tight. The outliers include countries in the Caribbean, whose female labor force participation rates are higher than predicted by the regression line, possibly because women often work as servants for foreigners and tourists.

The downward portion of the U has been interpreted in several complementary ways. When incomes are very low, women often work with other household members on family farms, in home workshop production, and as own-account workers. As incomes rise, various parallel changes occur that affect women's labor force participation. Economic development generally shifts the locus of production from the family farm and business to the factory, firm, and other places of wage labor. These shifts often occur because of increased relative productivity outside

family enterprises. Rather than working for the family, there is now the option of wage labor in agriculture and manufacturing at increased remuneration. But a general increase in income could serve to decrease women's paid work and unpaid labor in family enterprises through a simple income effect. Much depends on the existence of a social norm or stigma against married women's working at manual labor in agriculture, industry, construction, and transportation. Boserup, for example, maintains that factory work is almost universally abhorred by married women in many parts of the developing world (1970, p. 115), and there is considerable evidence that the social norm is widely held.[9] There is also the much-debated issue of how new technologies in agriculture impact women's work. It is often claimed that various technologies, while increasing income, also displace female workers through a reduction in female-specific tasks and an increase in machinery operated by men. Both an income and a complex demand effect are implied.[10]

As development proceeds education levels increase particularly for the males in the population. Only much later, in many countries, do they increase for women. Incomes, therefore, will continue to rise but women's relative productivity might not for some time, all of which could serve to reduce women's labor force participation levels further.

The rise in the U comes at a considerably more advanced stage of economic development, and in most countries it surfaces only as female education levels have increased beyond elementary school. As women gain education at the secondary school level and can obtain positions in the white-collar sector their labor force participation rates increase.

1.2 The U in theory

The previous discussion contained an implicit framework to interpret changes in women's employment across the process of economic development. A simple version of the framework is diagrammed in Figure 3. There will be two variants of the framework. One is termed the non-stigma equilibria and the other the stigma equilibria. Although it is possible to obtain a U-shaped labor force function with economic development (e.g., increases in per capita income) in the non-stigma case, the quantitative and narrative evidence appears more consistent with the stigma case.

I begin with the non-stigma case. The difference between the two is that, in the stigmatized equilibrium, families compare the difference in their utility when the wife is working in the manufacturing sector and when she is not to their loss in utility from the stigma imposed by her labor. The stigma is "all or none" (that is, it does not depend on the number of hours worked for the firm). Therefore whether or not the stigma-equilibrium is binding depends solely on the utility comparison.

The model contains one good (G) that can be produced by the family or by a manufacturing concern (the firm).[11] Women (meaning wives) can work for the manufacturing concern as operatives (manual, blue-collar workers) or, if they are sufficiently educated, as white-collar workers. Other family members work either at home production or outside the home for the manufacturing concern. There are three uses of the time of women: production of G by the family, production of G by the firm, and child care (C).[12] Total time in hours (per unit time, say a year) is given by T. Production of G within the family is governed by a production possibilities frontier (PPF) given here by gaT. Increased income from other family members lifts the production possibilities frontier upward by ΔG. The initial level of other family income is normalized to 0. Decisions regarding the woman's time allocation are made by the woman who also considers the impact of her work on the social status of her family. Her utility function is given by: $U = U(G,C) - \delta S$, where S is the utility value of the stigma and δ is a 0 or 1 indicator variable.[13] It is 1 if the wife produces G in the (manual or blue-collar) wage sector, even if for a few hours a week.

I consider three periods. In the first there is no firm employment. In the second period a firm offers a wage and income for families rises because other family members work for the firm. Women have the option of working for the firm as operatives. In the third period wages for women rise further, because women's education advances and they are offered jobs in the white-collar sector of the firm. I will assume that there is a relationship between labor force participation and the number of hours the representative woman (wife) works and that hours worked is total hours spend in the production of G, independent of its source.[14]

Figure 3 depicts a time allocation choice for a representative woman (wife) who chooses point a and works AT hours in home production of G and 0A hours at child care in period 1. With increased income of ΔG, but no change in their productivity, the woman moves to point b and reduces her time in the home production of G to BT. This change reflects the operation of the pure income effect. But the appearance of the firm also means that the woman is offered a wage to work outside the home. Assume that the wage, relative to the price of G, exceeds the slope of the PPF at b and that it is given by line v_2. With line v_2 a non-stigma or unfettered equilibrium has the property that the woman would choose either to work for the firm and do child care or just do child care alone. With wage given by line v_2, there will be no home production of G.[15]

Thus in period 2 if the increase in family income comes first, the woman would reduce her time in G production by AB (that is, by choosing point b). If the change in her wage occurs together with the rise in family income, she could increase her total hours in G production (say by CA) over that in period 1 (that is, by choosing point c).[16] Note, however, that at point a the wife spends AT hours producing G in the home, but at point c she spends CT hours producing G in the firm. The non-stigma equilibrium holds open the possibility of a U-shaped labor force function, but not necessarily if economic development increases family income and women's wages at the same time.[17]

In period 3 the woman's wage increases somewhat more, as given by line v_3, through an increase in her education and her employment in the white-collar sector of the firm. The change in labor supply is now determined by the usual (uncompensated) wage effect. For the sake of completeness, assume that the woman chooses point d.[18]

A norm that stigmatizes families, particularly husbands, for having their wives work at wage labor in manufacturing (or other manual jobs) will alter the equilibrium, particularly the change from period 1 to 2 and from 2 to 3. The equilibrium in period 1 is unchanged, but the response to the increase in the wage with the appearance of the firm in period 2 could be.

Each family has a value S giving the utility that would be lost from the social stigma of

having a wife work for wages as a manufacturing operative or manual laborer. The stigma is not a function of the number of hours at work but is "all or none." The wife can do no better than point c, given the option of working along v_2. She can do no better than point b in the absence of that option. The question, then, is simply whether $(U'_2 - U_2) \gtrless S$. If the utility value of the stigma is greater than the gain from being at point c compared with point b, the family will choose to remain at point b. The utility the family loses from having the wife work in the manufacturing sector is more than offset by the gain in utility from an expanded choice set. The probability the stigma will be binding is likely to be greater the lower the family income and will be greater the lower the woman's wage.[19]

The social stigma against wives working in paid manual labor outside the home is apparently widespread and strong. It almost always attaches to the work of women in male-intensive industries (e.g., mining, iron and steel), but also exists in female-intensive (e.g., clothing, textiles) and mixed industries (e.g., food processing). The prohibition is so ubiquitous that it seems likely to be connected with many of the most basic norms in society -- those which bind the family together as a productive unit. The stigma is a simple message. Only a husband who is lazy, indolent, and entirely negligent of his family would allow his wife to do such labor. The same stigma does not appear to attach to widows and to female children doing the same work. The shame, therefore, attaches to the husband and serves to enforce a powerful social norm that obliges men to provide for their families. For various reasons, discussed below, the stigma does not generally attach to women working in the white-collar sector.

If the stigma equilibrium is binding the woman will choose point b in period 2, but she will select point d when offered a white-collar job. Thus the movement across the three periods is from a to b to d, tracing out a U-shaped labor force participation function.[20] Note that when the stigma effect is binding on at least some families, the econometrician will incorrectly measure the true, underlying wage effect. It will be measured as 0 between periods 1 and 2, and will be considerably larger than the true underlying wage effect between periods 2 and 3.[21] The response to a change

in wages is first underestimated and then overestimated by the family's fettered equilibrium. As more families make the move from a point like b to a point like d, the measured wage effect will decrease. Therefore, the econometrician will observe first a negligible wage effect, then a very large one, and then one of some moderate (and more accurate) proportion.[22] The same effects can be produced by a model with fixed costs. As the wage rises, the fixed cost effect of entering work outside the home binds fewer families.

The income effect is also biased. At higher levels of income there is a greater probability of having the stigma effect bind.[23] Thus if the only wage work for women is in the manufacturing sector, their participation will decrease more as income increases. Some of the decrease will be due to a decrease in home production (as in the movement from a to b). But some will be because more and more families reach the point where $(U'_2 - U_2) < S$.

Thus, one explanation for the U-shaped function is that we initially observe the impact of an income effect when women's educational levels have not yet advanced and when their only employment opportunities outside home production are manual labor jobs in manufacturing and agriculture, for which there is often a social stigma. Women's labor force participation will fall as incomes rise and even as their own wage rises. Only when women are enabled to enter jobs in non-manual work through their increased education will their labor force participation rate rise again.

1.3 Evidence on the rising portion of the U-shaped function

The downward portion of the U has been explained by several related changes, only some of which are directly captured in the framework just outlined. Women's labor force participation decreases with economic development because their household production declines as economic development progresses while their wage labor does not immediately increase. A simple income effect may be operating. Household-produced goods may become unprofitable to make and sell relative to factory production. Similarly, changes in agricultural technology may reduce the demand for women workers.[24] A central issue is why women do not follow production into the factory.

Their reluctance can explained by the existence of a stigma or by any fixed expense of entering the paid labor market outside the home, such as travel costs.

Understanding why the female labor force function begins to rise, is the next topic and leads to an exploration of the relationships among economic development, female education, and white-collar employment. The first issue to address is when female schooling levels increase.

At relatively low incomes and low male schooling levels, the ratio of male to female education is extremely high. As resource constraints are reduced both male education and female education rise, but female education rates rise faster and begin to converge on those of males. The sources of reduced resource constraints can be found at the household and governmental levels.

Figure 4 shows the relationship between the ratio of male to female secondary schooling gross enrollment rates and years of education among the male adult population. With increased male education the ratio of male to female gross enrollment in secondary school declines, rapidly becoming one and often less.[25] Increased income, as reflected in the increase in education levels for the male adult population, at some point leads families to endow their girls with relatively more education and also aids in the extension of publicly-provided education.

Increased income fuels schooling and expands the supply of educated workers to the white-collar sector. Figure 5 shows the positive association between white-collar employment and GDP/capita.[26] But increased GDP/capita is also an indicator that the economy has undergone a structural transformation that decreases the agricultural sector and increases that in services. Both demand and supply effects work in tandem to increase the share of the labor force in white-collar employment. At higher income levels the demand for educated workers is greater and with greater incomes the supply of educated workers expands.

But increased GDP/capita, or its general correlate years of schooling for the adult male population, alone is insufficient to raise the fraction of all employed women who are clerical workers or to raise the proportion of all clerical workers who are women. Figure 6 graphs the relationship

between the ratio of female to male clerical workers and the log difference between adult male and female years of education (see also the discussion of this relationship in Boserup 1970, chapter 8). A line has been drawn at the 15% difference mark in terms of male and female educational levels and at equality in their employment in the clerical sector.

Most of the countries to the southwest of the crossing point have very low levels of both female and male education. They have few women relative to men in clerical work despite equality of education. Those countries to the northeast, and there are only three, have a high ratio of women in clerical work although their educational levels are less equal. Two of these countries are Singapore and Hong Kong. All of the rest of the countries lie along what appears to be a hyperbola, with the very highest ratios of women to men in the clerical sector found for those countries with the most equality of education between the sexes (note that several countries, including the United States, having a sex ratio in the clerical sector above 3 have been omitted from the graph). As long as males receive considerably more education than do females, the ratio of women to men in the clerical sector is low.

But the relationship graphed in Figure 6 might be caused by the fact that women's education levels are low, not just relative to men, when the difference in the education is highest. Their absence as clerical workers, then, would stem then from their lack of education in absolute terms. In a regression context we can hold both constant and observe that the ratio of the male to female educational attainment matters, to some degree, even when the percentage of women in the adult population who attended any secondary school is included:

Dependent variable: (Female/Male) Clerical Workers

Log(male/female years of education)	-0.375 (1.84)
% females with secondary education	0.0315 (6.23)
Constant	0.523 (3.03)

adjusted R^2 = 0.47; number of observations = 83
Ordinary least squares estimation; t-statistics in parentheses.

Sources: Occupational distribution and labor force participation rates c. 1980: United Nations (1992); years of school for the adult (> 25 years) female and populations in 1980: Barro and Lee (1993).

The ratio of female to male clerical workers rises with female secondary schooling and falls as the ratio of male to female total years of education for the adult population rises. As Boserup observes, competition from men serves to force women out of clerical employment.

Both effects -- increased education and increased white-collar employment -- impact the labor force participation of women, particularly those who are married and older. The social stigma against a wife's working generally does not exist for occupations in office work and sales, even when it is very strong in manual labor.[27] Thus increased education of women, particularly at the secondary school level, will increase the female share of office and sales employment. The increase will be almost immediate, since these women often take such positions directly after their school years. But the impact on the labor force participation of married women could take several decades more. The young women whose educational levels increase and who become office workers upon graduation will marry, have children, exit from the labor force, and then return to the work force later in their lives. Thus part of the rising portion of the U-shaped function may trace out the increase in women's secondary schooling and their employment in the clerical and sales sectors of the various economies.

Strong evidence for the theory just proposed is difficult to muster in large measure because the data available are not appropriate to it. The theory is one of generational change, but the data sets are generally cross sectional or have limited historical information for the countries. One suggestive regression is:

Dependent variable: Female labor force participation rate of 45 to 59 year olds

% male labor force in white-collar sector	-0.793	(2.16)
% of female labor force in clerical sector (%FCLER)	-1.25	(2.16)
Years of schooling of adult women (FSCHL)	0.0153	(0.83)
%FCLER × FSCHL	0.168	(2.25)
Constant	0.514	(8.59)

adjusted R^2 = 0.18; number of observations = 82
Ordinary least squares estimation; t-statistics in parentheses.

Sources: Occupational distribution and labor force participation rates c. 1980: United Nations (1992); years of school for the adult (> 25 years) female population in 1980: Barro and Lee (1993).

The labor force participation rate of women 45 to 59 years old decreases with increases in the white-collar fraction of all employed men, a likely consequence of an income effect. It decreases with increases in percent of the female labor force in the clerical sector when female education is below about 7 years, but it rises with the proportion of female workers in the clerical sector when female education levels are above 7 years, that is at the secondary school level. It also rises with female schooling, although not significantly. It is most important that the female labor force participation rate rises with female schooling in relation to the proportion of the female labor force in the clerical sector. The interaction between female schooling and the proportion of the female labor force in the clerical sector is the most telling result. Neither in isolation is sufficient.[28]

The rising portion of the U-shaped function has suggested to many that the (negative) income effect eventually becomes swamped by the (positive) substitution effect. I have suggested that this effect is either caused by or reinforced by the existence of a fettered equilibrium. The fettered equilibrium can be driven by a stigma regarding woman's work in the manufacturing sector or by fixed costs of working outside the home.

One may wonder why the social norm against married women's working in manual labor generally does not exist for white-collar labor. The social stigma against a wife's working in the white-collar sector may be low because highly educated women across many cultures are given license to work for pay. The women thus employed are often teachers and nurses, but are also in a variety of white-collar occupations such as sales and office work. If higher-class women are given the privilege of working for pay in these sectors, then, the argument goes, lower income women can as well. The point is that when a woman takes a job in manual labor she is signalling that her husband is neglectful and thus the norm -- one protecting the family -- can take effect. No educated, higher income man would allow his wife to work in the manufacturing sector, thus the wife must come from a lower-income household. But the signal is mixed when a woman takes a white-collar job. She could be an educated woman married to a hard-working man or she could be an educated woman married to a slothful man.[29] The norm cannot take effect.

I am suggesting that one reason for the existence of the U-shaped female labor force participation rate function is the relationship between female education and economic development. At low levels of development, education increases for males far more than for females. Incomes rise and the income effect on female labor supply serves to lower female participation. A norm against women's working in manufacturing serves to reinforce the income effect, because the higher is income the greater the probability of a binding stigma effect. As incomes rise even more, educational resources are freed and females receive more education. As women take jobs in the white-collar sector the stigma effect is eliminated, and the substitution effect increases. With greater education for women and a larger white-collar sector, the income effect falls because more families no longer face the stigma effect of manufacturing work. The U is thereby traced out.

2. The origins of married women's labor force participation in the United States

2.1 The U-shaped female participation rate function in U.S. economic history

The labor force constructs that lie behind the various data in Figures 1 and 2 are vaguely consistent from country to country but not ideal. The constructs that are readily available to trace one country through its history are often far worse. In the United States, for instance, the modern concept of the labor force was first embodied in the 1940 census. The concept previously used was that of "gainful employment," for which having an occupation was equivalent to being in the labor force. Most adult men listed an occupation, but the vast majority of adult women did not.

Without careful archival research our knowledge of women's employment in the past would be woefully lacking. In 1890, for example, less than 3% of all married, white women gave the census taker an occupation (see Table 1).[30] But we now know that a far greater percentage worked for pay or produced for the market sector either in their own homes, on the family farm, or in the family business. Still others worked intermittently or for few hours a week and never reported their occupation to the census taker. Given the social stigma against their working, it is not surprising that the reported labor force participation of married women was extremely low when

women's work was primarily in domestic service and manufacturing.

The historical record on women's work in the United States is now sufficiently complete that a U-shaped functional relationship can be found there as well. Rather than a participation rate of 2.5% for all married, white women an adjusted figure is probably just under 15% in 1890. The adjustments add in a fraction of boardinghouse keepers, unpaid family farm workers, and uncounted female workers in manufacturing.[31]

The more inclusive measure of the participation rate of married, white women probably exceeded 15% earlier in the nineteenth century, and it may have been considerably higher. We now know, for example, that urban women in the late eighteenth and early nineteenth centuries took part in their husband's trades when the businesses were operated in the family's domicile (Goldin 1986) and that women contributed to market production on farms in a myriad of ways. Thus it is likely that married women's labor force participation rate first fell before beginning its steady climb upward sometime in the twentieth century.

By 1940, when the procedures used by the census established the labor force construct, the labor force participation rate of all married, white women was just 12.5%. The adjusted estimate for 1890 is a bit below 15%. Thus even though we do not know the precise dimensions of the U-shaped function for U.S history, it seems clear that it existed. I believe that the bottom was reached sometime in the 1920s.

It is not surprising that most of the discussion of women's labor force participation in U.S. history has ignored the falling portion of the U, for it became apparent only as researchers scoured sources other than the U.S. federal population census. It also became more obvious as scholars looked to the development literature for guidance on studying the histories of industrialized countries (Durand 1975). Their reasoning was quite simple. If all countries taken together trace out a U-shaped function, then each country's history probably did.

The rising portion of the U has dominated the literature on female labor force participation in the United States and other developed economies. Beginning at least with Mincer's (1962)

pioneering article on the female labor force, the central question for economists has been how women's labor force participation could increase in the face of rising incomes given the negative impact of the income effect. The answer, supplied by Mincer, is that the substitution effect was strongly positive and that it swamped the income effect (see, for example, the articles in Layard and Mincer 1985, for a confirmation of the relationship across a variety of developed economies).[32]

We now know that the histories of women's employment in many developed economies trace out the same type of U-shaped function apparent across a variety of the world's countries at any point in time, such as those in Figures 1 and 2. If the substitution effect strongly outweighs the income effect along the rising portion of the U, what happens at the other side of the U and what causes the function to change directions and turn upward? The existence of a U-shaped function raises the distinct possibility that measured income and substitution effects may not be constant across the process of economic development.

The reasons why the function changes direction can be sought in whatever factors cause the substitution effect to increase and eventually outweigh the income effect. As noted previously, the estimated income effect may decrease over time as the substitution effect increases. By reinforcing each other, changes in both the income and substitution effects could have contributed to the upward portion of the U. There is also the possibility that relative prices (including wages) change across the process of economic development or that certain fixed costs, for example of travel to factory work, decrease. Although these are possibilities, the record for the United States, at least, suggests that the primary change is found in the parameters of the income and substitution effects.

2.2 Secondary schooling and female labor supply

The increase in the substitution effect, and the probable decline in the income effect, occurred in the United States some time after the increase in secondary schooling for both male and female youths.[33] Secondary school enrollments and graduation rates advanced at

remarkable rates in the first several decades of the twentieth century. The graduation rate in the non-South regions of the United States rose from less than 10% of the 17-year old population in 1910 to about 50% by about 1937 (see Figure 7). Thus the median 17-year old in the non-South United States in 1937 was a high school graduate, even though just twenty-seven years before fewer than one in ten 17-year olds would have received a high school diploma.[34] It should also be pointed out that the graduation rates in Figure 7 have been drawn to the late 1950s to highlight the fact that the growth of high schools during the 1920 to 1937 period was extraordinary. Virtually all of the increase during the half-century depicted occurred in that seventeen-year period.

Female youths were 1.5 times more likely to graduate secondary school than were male youths in the 1910s and 1.25 times more likely in the 1920s. In fact, in every year and in every region in the United States, young women were more likely to enroll, attend, and graduate from secondary school than were young men.

Many of the world's countries have undergone a similar transformation of their secondary schools during the past thirty years. That occurring in the southern portion of the Western Hemisphere comes the closest to what occurred in the United States during the 1920 to 1937 period, although the levels are a bit lower. Mexico in 1960, for example, had a secondary enrollment rate of 8%, but by 1987 it was 53%; that in Colombia rose from 11% to 56% in the same interval. Almost all the countries of South America, Central America, and the Caribbean had secondary enrollment rates in 1960 in the 10% to 20% range (with the exceptions of Argentina, Jamaica, Panama, and Uruguay which were considerably higher, and Haiti which was far lower), but by 1987 most Latin American countries had secondary enrollment rates in the 40% to 60% range.[35] Because these rates also include the lower secondary grades whereas those for the United States generally include only grades 9 to 12, comparability is imperfect. But it is likely that a comparable enrollment rate for the non-South United States in 1910 was about 40% and that it was 87% by 1937.[36]

Another important area of similarity between U.S. educational history and recent trends in

Latin America concerns gender differences. Latin America is the only part of the developing world in which girls are educated in secondary schools to the same degree or greater than boys. It is extremely interesting that the labor force participation rates of women in many Latin American countries are at the bottom of the U in Figures 1 and 2, raising the distinct possibility, explored later in section 3, that Latin America will soon see large increases in female labor force participation very similar to those experienced in the United States in the post-World War II period.

The equality of education by sex in the United States at the primary and secondary school levels -- indeed the superiority of female education -- almost throughout its history is unique in the world's educational history. The only other countries that come close to such equality of treatment are those that have been affected by U.S. occupation, and, as just noted, much of Latin America but only for the past several decades. Part of the reason for gender neutrality in educational attainment in the United States is the universal public funding of primary and secondary schooling in the United States. But girls were taking advantage of this free schooling at decidedly higher rates than were boys.

The reason girls attended secondary school for longer periods than did boys, and attained high school diplomas at far greater rates, was because such schooling had more obvious and higher returns for them. The alternative to secondary school for a young woman was a manufacturing job. Secondary schooling, on the other hand, offered her the option of an office job. At the turn of this century many office jobs -- typists, stenographers, secretaries -- earned very high wage premia. But by the 1920s the wage premium paid to female clerical workers had fallen with the large influx of teenagers from high schools and other students from a variety of business and commercial schools. By the 1920s, the average female office worker earned about 30% more than her counterpart in manufacturing and that premium probably remained in place until the 1940s (Goldin 1984, p. 14). It should be noted, however, that the private internal rate of return to education is not so easily calculated. Had these individuals worked for the remainder of their lives, the return would merely be the premium divided by the number of additional years of school

needed to move from the manufacturing to the clerical job. But women in the 1920s and 1930s did not work for very long after they married, even when they made the transition to white-collar employment.

Manufacturing jobs were not demeaned just because they paid less than did those in offices, because many industrial jobs paid relatively well by the 1920s. Office jobs were decidedly preferred because they were "nice" jobs, and they were the jobs that "nice" girls took. They were cleaner, neater, generally shorter in hours, and they commanded considerably more respect. That young women gave these factors considerable thought is found in the contemporary literature on vocations. "The ambition of the school girl to "work in an office" in preference to work in a factory has often been commented on by vocational counsellors and others in touch with girls who are seeking their first jobs" (Breckinridge 1933, p. 181).

A few years of high school catapulted a young woman from a life of drudgery and disrespect into a world of comfort and courtesy, or so it seemed to her. The young man, however, did not often see high school as having so positive an impact. The rather dead-end clerical and sales positions opened to young women were not the road to success for the young man. Machinists, electricians, and other tradesmen could enter their craft with far less than a high school diploma and little apparent loss. Thus the apparent private return for young women was actually higher than for young men, even though the latter remained employed for a considerably longer fraction of their lives.

Another change for young women in the 1920s was their ability to remain in white-collar employment after they married. Only in textile-mill towns and other cities with light-industry were married, white women employed to any extent outside the home in the pre-1940s period. Employment changes of the 1920s were apparent to many commentators and were expressed, for example, in the famous ethnographic study of the Lynds. "When one speaks of married women's working in Middletown one is talking almost exclusively of Middletown's working class and the lowest rungs of the business class. Among these last . . . there is discernible a tendency for a

young wife to retain a clerical job until her husband begins to get established. At the other extreme of the business class, there are one or two young wives of men so wealthy that there can be no question locally of their "having to work," and thus no reflection on their husbands' ability to "provide" " (quoted in Goldin 1990, p. 134). As more women became educated, the social stigma of a wife's working declined.

The notion that the substitution effect rose over time and that the income effect declined in absolute value is not just a theoretical idea or mere rationalization of the time series movement. Rather, there are a host of cross section studies from 1900 to the 1960s that, taken together, exhibit such changes (see Goldin 1990, table 5.2). The studies suggest that the substitution effect was at a high point for U.S. women in the 1950s and 1960s, whereas the income effect may have continued to decline from the early twentieth century down to the present.

Thus Mincer's study, as well as other influential analyses of female labor supply, may have been executed at the peak of the own-substitution effect in the United States (see Bowen and Finegan 1969, for another early important study). Of more importance for the total impact of an increase in women's real wages, it may reflect a historic peak in the difference between the own-substitution effect and the total-income elasticity [the income effect × (the wife's full-time income/family total income)]. Also historically high during the 1950s and 1960s was the difference between the wage elasticity and the income elasticity. It is this difference that moves us along the upward sloping portion of the U-shaped function as incomes rise, as long as wages rise equally (or greater) for women than men. The stability in the gender gap in wages during that period is evidence that they rose at approximately equal rates.

2.3 The rise of women's white-collar employment

I have alluded to the impact secondary schooling had on the occupations of young women in the 1920s and 1930s but have not yet demonstrated that their work was fundamentally altered during the period. Also left to be established is the notion that participation in these jobs early in their lives altered their predisposition to paid employment later, a somewhat more slender thread

in the empirical analysis. Although the discussion emphasizes the clerical group, many in the sales and professional sectors, particularly teachers and nurses, could also be included.

The clerical sector is emphasized because office work required nothing more than some secondary schooling, and its rise led to the first large shift in female employment away from operative positions in manufacturing. It was also a sector that grew enormously in absolute terms and in terms of its female composition during a brief period in American history that coincided with the expansion of publicly provided secondary schooling.

In 1890 about 15% of all office workers were female and just 4% of all employed women in that sector were married (see Table 2). By 1910 36% of all office workers were female and in 1920 the figure had risen to 48%. Thus by the 1920s office work in the United States had become feminized. The share of women in the total employment of the clerical sector remained at about 50% from 1920 to 1940. But the share of employed female clerical workers who were married reached 26% by 1940 and then climbed to 42% by 1950 when 62% of all clerical workers were women. Whereas only 4% of all non-farm employed women were in the clerical sector in 1890, more than 20% were thus employed by 1920.

The point is that office work became mainly a female domain in the 1920s, although at the time it was the bastion of single, not married, women. Married women, however, increased their numbers in this sector at a greater rate than they did in the nation's employment as a whole. Although clerical work was a field dominated by relatively young women in 1930, it had the same proportion of married women as did the female labor force as a whole by 1950.

The rapid increase in the number of young female clerical workers in the two decades after 1910 was fueled by the phenomenal increase in secondary school enrollments and graduation rates, as shown in Figure 7. These workers were primarily unmarried women some of whom continued working in offices and in sales positions for short periods after they married. But some married women in the 1920s and many in the 1930s were faced with bars against their employment in office work. Marriage bars -- the stated policies of firms not to hire married women

in certain positions and to fire single women who married while in their employ -- existed in the 1920s in some firms, but they became far more widespread during the Great Depression (see Goldin 1990, chapter 6).[37] Thus the longer-run and full impact of the increase in white-collar employment in the 1910 to 1930 period had to wait for the 1940s and 1950s when marriage bars were generally dissolved and when the women of these cohorts were in the forties.

The evidence on the impact of early work experiences on later labor market participation is slim for the period under consideration. One data set, however, has been found that contains information on a women from a wide variety of backgrounds, interviewed in 1939 about their past work and educational histories (Goldin 1989, table 3). The data suggest that women who had worked in manufacturing early in their employment histories were less likely to be labor market participants later in their lives. Their participation rates were 10 percentage points lower than were those of the other women whose first jobs were in sales, clerical, professional, and other service employments. Because the base labor force participation for this group was 25%, the impact of first employment in manufacturing was substantial.

The data set is insufficiently rich to separate the impacts of income effects, substitution effects, and changing taste for work. There is, however, confirmation that whatever the locus of reasons, a change in the employment of young women from manufacturing to white collar work -- even lower-paid white collar work in offices and stores -- can increase labor force participation later in their lives.

The key point I am making is that the rise of office work in the 1920s and 1930s was an important component of the increase in married women's labor force participation in the 1950s. The explosion of married women's labor force participation in the 1940s and 1950s was primarily experienced by women older than 40 years (see Table 1). Although there were important increases at the younger ages during those decades, the participation rates of married women under 40 years were to soar later, from the end of the 1960s to the 1980s.

Although I have thus far emphasized only the white-collar occupations that required just

a high school education or diploma, the rise of high schools in the early twentieth century also fueled the increase in college, normal school, and nursing school enrollment in the post-1940s. In the college graduating class of 1957, for example, more than 60% of the women became teachers, social workers, nurses, and librarians in their first few months after graduation (Goldin 1990). The vast majority of these women would exit the labor force with the birth of their children and would remain out for varying lengths of time. But their intention in getting their degrees and in their early employment was to establish an opportunity for future participation. The next cohort of women would enter the labor force after school with the full intention of remaining in it with only small breaks for child bearing and rearing.

A decisive shift had been made in married women's labor force participation. No longer would young women exit from the labor force upon marriage not to reenter unless family income was extremely low or when they became widowed or were abandoned. Women now planned their education and labor force investments with a considerably longer time-horizon for their employment. All of these changes find their origins in the rise of secondary schooling in the first few decades of this century and in the rise of white-collar employment of women.

3. Economic Development and Economic History: Concluding Remarks

The path the world's developing countries are currently taking will never trace out that which the United States took to the present. The United States, for example, was never as poor on a per capita basis as are the poorest countries today, and it never had as high a percentage Muslim, Hindu, or Catholic as many of the world's countries, to mention but two differences that affect comparisons in the status of women. But there are many similarities in the role of education in spurring change for women.

In the early twentieth century the United States underwent changes in education not unlike those currently underway in Latin America. In both cases, secondary schooling advanced sharply in a brief period of time and the levels for girls and boys were very similar. Many of the countries

in Latin America currently occupy the base of the labor force U-shaped functions of Figures 1 and 2. In all but the Caribbean, female labor force participation rates (for those 25 to 44 years) are in the 20% to 40% range.[38] The percentage of female workers who are employed in the clerical sector is in the 10% to 20% range, approximately what it was in the United States in the 1920s.[39] The percentage of all clerical sector employment that was female is in the 30% to 40% range, once again approximately equal to what it was in the United States in the 1920s.

Although I do not know from the aggregate data which women are occupying these white-collar positions, I suspect it is disproportionately younger women, as it was, until the 1950s, in the United States. It is likely, therefore, that many women in Latin America are ripe for the transition to the upward sloping portion of the U and that married women's labor force participation rates will rise substantially in the next decade or so even if income levels do as well.

The newly industrialized countries of Asia present a mixed picture. In some, for example Singapore and Hong Kong, educational change has been rapid and women are quickly moving into white-collar occupations. But in others in which educational advances are also great, for example Korea, women are poorly represented in the clerical trades. This is also the case in the Philippines in which incomes are lower than in the three countries just mentioned but schooling levels are quite high.[40] According to the framework proposed, married women's labor force participation rates will, in the future, advance less in Korea and the Philippines than in Singapore and Hong Kong, and that women's status in various ways will progress differentially between the two groups.

In sum, I have demonstrated that the labor force participation of women is generally U-shaped over the course of economic development. The reasons for the downward portion of the U are probably found in a combination of an initially strong income effect and a weak substitution effect, and a change in the locus of production from the home to the factory. It was the rising portion of the U that concerned most of this essay. Why the function changes direction holds the key to why women enter the labor force at higher stages of economic development and why their social, political, and legal status generally improves with economic progress. The reasons were

sought in the change in the education of females relative to males as educational resource constraints are relaxed, and in women's ability to obtain jobs in the white-collar sector after school completion. Their increased education and their ability to work in more prestigious occupations both increases the substitution effect and decreases the income effect. As the substitution effect begins to swamp the income effect, the upward portion of the U is traced out, and women's labor force participation enters the modern era.

ENDNOTES

1. By an income effect I mean the change in hours of work of an individual with respect to a change in family income. The own-substitution effect is the change in hours of work of an individual with respect to a change in their wage, holding income constant. I will refer to the own-substitution effect simply as the substitution effect. By the substitution effect I will mean the compensated wage effect.

2. Miller (1982) is a fine study of the effects of women's employment in India on reducing female seclusion and segregation.

3. All countries with available data except those in the Middle East and those centrally planned are shown. The centrally planned economies are: Bulgaria, China, Czechoslovakia, Cuba, Hungary, Romania, the USSR, East Germany, and Yugoslavia, although data for some of these countries was not available anyhow. Also excluded are countries for which the labor force data differ substantially from those relating to employment status. The results do not materially change if all available countries are included.

4. Even though certain religions are important in determining female labor force participation rates across countries, the percent Muslim is not once the countries of the Middle East have been excluded, in a regression of the participation rate on a quadratic in per capita GDP.

5. The economically active population data on which the labor force numbers are based comes from International Labour Office (1986) according to the WISTAT reference manual.

Justifications for using the Barro and Lee data in preference to those of the World Bank can be found in Barro and Lee (1993).

6. I have explored differences between the labor force data in WISTAT (which are from International Labor Office 1986) and those (also from WISTAT) from various country sources which are subdivided by employment status (wage labor, self-employed, unpaid family worker). There are several countries in which the differences are very large. In some cases the labor force numbers are greater and in others those by employment status are. Bangladesh, the Central African Republic, the Dominican Republic, El Salvador, Guinea-Bissau, Jamaica, Jordan, Lesotho, Niger, and Pakistan all have differences exceeding 30% in absolute value. There are 8 other countries in which the differences exceed 20% in absolute value but are below 30%. Another 20 have differences that exceed 10% but are below 20%. These countries have been excluded from both Figures 1 and 2. In only a few cases can I figure out the precise reason for the discrepancy (e.g., differences in dates, exclusion of unpaid family workers). I should note that only the labor force data are given by sex and age, and that is the reason for preferring them.

7. The WISTAT data contain only three age groups in the 20 to 59 year range – 20 to 24, 25 to 44, and 45 to 59 years. There are also data by marital status and age, but many countries are not covered in sufficient detail.

The relationship between the labor force participation rates of the 25 to 44 year old group and those of the 45 to 59 year old group is quite tight. For all countries in the sample (not excluding those of the Mideast, for example) the relationship is:
lfpr 25-44 = 0.095 + 0.927 lfpr 45-59, corrected R^2 = 0.854 (N = 164 countries).

8. See Hill (1983), for example, for an analysis of the determinants of female labor supply in Japan (c. 1975) which takes into consideration the choice of wage employment, family employment, and nonemployment. The determinants between wage and family employment are very different. Whereas the wage and income effects on wage employment have the usual signs, those on family employment have signs that are difficult to interpret and suggest that some determinants have not been adequately controlled for in the analysis. Duraisamy (1993) analyzes the determinants of wife's employment in wage labor and self employment in urban south India and finds more neoclassical results in both employments. There is, though, a greater negative effect of assets on wage employment than on self employment.

9. Hein (1986) reports that in Mauritius "the general tendency among single [women] workers is to leave factory employment around the time of their marriage, even before they are pregnant or have any children to look after" (p. 288). The timing of these withdrawals is precisely what I have found for the United States from 1890 to 1940 (Goldin 1989, 1990). As in other countries, Hein notes that "husbands' opposition to their wives' working, particularly in a factory, is a crucial factor in these withdrawals" (p. 288). Mauritius is at the bottom of the U in Figure 2.

10. The impact of the Green Revolution is a good example. Mukhopadhyay (1991), for instance, demonstrates that in West Bengal, India the introduction of high yield varieties increased income, decreased female labor force participation, and increased fertility. The direct income effect is only one part of the reason for the decrease in women's participation in agriculture. The other part has to do with changed demands for sex-specific agricultural duties. Weeding, a female occupation, was reduced considerably with the introduction of weedicides, but the use of machinery, a male occupation, was increased with Green Revolution technology. One may question the impact of the technological changes in the absence of income changes.

11. The model borrows from that in Gronau (1977).

12. There is no pure leisure time. The G produced by the firm and the G produced by the home are perfect substitutes, as in clothing made by machine in a factory or in a home workshop.

13. The stigma (S) is treated as a positive number and is, therefore, subtracted from the utility level.

14. The model could easily be extended to the case in which there is wage work in home production before wage work that takes place at the firm.

The relationship between female labor force participation and hours of work is discussed, for example, in Goldin (1989).

15. The wage is always expressed relative to the price of G. With wages somewhat less than that given by v_2 there would be some household production of G. None of this affects the results, but makes the diagram cleaner.

16. Of course, the exact positions of points b and c are indeterminate. If child care and goods are both normal goods (that is, if the income effects of both are positive), point b must lie to the northeast of point a. By the same logic, point c would lie to the northeast of a point on U_2 (not drawn on the diagram) that is at the tangent of U_2 at a slope given by v_2. I have drawn point c so that the substitution effect outweighs the income effect of the increase in the wage. That is, there is an increase in time spent at work with an increase in the relative wage. But the income effect of an increase in wages could outweigh the substitution effect and time spent at work could decrease (that is, point c could be to the northeast of point b.

17. As noted before, point c can lie to the northeast of point b.

18. Once again, I am assuming that the substitution effect of a change in the woman's wage swamps the income effect of the same.

19. It will be greater the higher is the wage increase, for the simple reason that a higher wage increases the change in potential utility from working outside the home. It will be greater the higher is family income if marginal utility of income decreases with income.

20. Additions to the model will reinforce the U-shape. For example, if the movement from home production to firm production involves a fixed cost, the line v_2 will be lowered a fixed amount, equal to the fixed costs of going to work, getting another family member to take care of the children, and so on. The choice set is now constrained to be some combination of the PPF and the line v_2 shifted down.

Another addition concerns the efficiency of household production when the firm competes with it. The model is constructed so that there is no change in the efficiency of home production and no change in the price of the home produced good relative to the firm-produced good (as might exist if there were differences in quality). One possibility is that as some households reduce their production of the good, the fixed costs of marketing it increase. If the good were collected by agents, the price received for it could decrease as the market became geographically thinner. Indeed, the market could become so thin that production is driven to zero.

21. Note that the wages of women will be correctly measured because women also include non-wives, who do not experience the stigma, and because some wives will not face a binding stigma-equilibrium. The econometrician will measure the correct wage increase for women from period 1 (not shown) to v_2 in period 2 because wages will be recorded for some women. But families in which S is low will have wives who shift from point b to point c, whereas in families having a high S wives will remain at point b. By the "true wage effect" I mean the response from point b to c, that is in the absence of the stigma. The more families with a high value of S, the lower will be the measured wage effect. If S went to zero for all families (perhaps because the job were no longer manual labor but was, instead, an office position), all wives would move from b to c and the true wage effect would equal the measured wage effect. When S is high enough, the measured wage effect (from period 1 to 2) will be zero but will be equal to the true wage effect (from period 2 to 3) when wages (in office work) rise to v_3.

22. I say "more accurate" in terms of the non-stigma equilibrium.

23. Although this need not hold, it is likely to hold for some range of income.

24. One way of incorporating the possibility that home or agricultural production methods change, but that women are excluded from the new technology, is to consider the fact that the old technology can still be used but that the price of the output decreases relative to the value of time in using the new technology. That is, the value of G is reduced relative to family income.

There is also the possibility that as fewer families produce in home workshops, the costs of marketing and distributing the goods and inputs increases. When families are engaged in piece-rate production, for example, the greater the density of such families the lower the costs of distributing the inputs and collecting the finished pieces. As fewer families are involved in piece-rate production, the per unit costs will rise. This change can be incorporated into the model by lowering the PPF, viewed here as net production (actual production minus the costs of distribution and marketing).

25. Many of the countries that lie below the line of equality of education between males and females -- that is, have greater secondary schooling rates for females than for males -- are in Latin America.

26. The percentage of the total labor force in the clerical or office work sector could also have been used. About one-third of all white-collar workers are clerical workers.

27. Boserup (1970) quotes from an ILO report on Uganda that "The idea of being employed by an outsider except in a post requiring education is distasteful both to her [the woman] and to her family and husband" (p. 116). In her discussion of India and Pakistan she notes that "public opinion makes a sharp distinction between work in home industries and "literate work" which are regarded as respectable occupations, and factory work which is not regarded as respectable for women" (p. 115).

28. When the same equation is estimated for the 25 to 44 year old group slightly different results are found. Years of schooling for adult women has a greater impact, but the percentage in the clerical sector has a smaller and less statistically significant impact. The interaction effect is also smaller.

29. Boserup (1990, p. 141) suggests that as white-collar work expands for women in developing countries many will marry men with lower levels of education than they. Thus blue-collar workers will have wives who are white-collar workers. But as long as the wives of white-collar workers are themselves employed in white-collar work, such work cannot be stigmatized in the same way that blue-collar work is for married women.

30. The percentage of married African-American women who listed an occupation was considerably higher. Almost all of them were domestic servants or agricultural laborers.

31. For comparability with the labor force construct of modern estimates only a fraction are included to get an hours-adjusted measure.

One could also question whether the data from certain developing countries accurately count women whose labor is often hidden from view even though they are involved in market-oriented production. Many of the censuses on which the ILO data are based do try to count these workers, but, as was pointed out in an earlier section, there are inconsistencies across countries.

32. Most of the studies I cite estimate the income effect primarily from data on the income of the husband, not from data on wealth. Thus there is an implicit constraint on the compensated cross-substitution effect of a change of the husband's wage on the wife's time allocation. It is assumed to be zero.

33. Secondary schooling in the context of United States history is grades 9 through 12. The secondary schooling data for the cross section of countries include 7 through 12, or generally ages 12 through 17 rather than 14 through 17.

34. It should be noted that these data are not yet corrected for various undercounts in both public and private graduation data. It is unlikely that these adjustments will increase the 1910 figure to more than 15%. That for 1937 is likely to be virtually unaffected. Also, the data on private school graduation do not exist after 1933. The entire function should be about 10% higher after that date. These and other corrections will be made in my future work on the history of secondary schools (for a preliminary work, see Goldin 1994). Only the data for the non-South are used here because the South lagged in education in various ways.

35. These data have been provided by Anne Hill and form the basis of King and Hill (1993b). Data in Schultz (1988, table A-2) are similar and show that Latin American countries had an increase in secondary enrollment rates from 14% to 44% from 1960 to 1980. See also Bustillo (1993) who reports somewhat higher rates than King and Hill (1993b), although the end date is 1987, somewhat later than in King and Hill.

36. The enrollment rate of 14 to 17 year olds was about 20% in 1910 and 80% in 1937 in the non-South United States. Virtually all 12 to 14 year olds were in school in the non-South even in 1910. Assuming that there were half as many 12 and 13 year olds as 14 to 17 year olds and that all of the 12 and 13 year olds were in school yields the numbers given. If the proportion of 12 and 13 year olds in school was 80% in 1910, the 1910 figure would have been 33%.

37. The ILO has documented that these policies were widespread in the teaching field across a variety of countries (see Goldin 1990, chapter 6). It is interesting that firms and school districts instituted these marriage bars in white-collar employment since the societal norm against married women working in these fields was considerably less than in manufacturing and manual labor. The husband was made to feel the stigma of his wife's working in blue-collar employment, but society imposed a rule against her working in white-collar employment.

38. Note that I have switched to a younger age group because the interest here is in seeing the impact of increasing education on the jobs and labor force participation of younger women. The data I have currently available do not divide the occupational data by age.

39. See Table 2 for the United States data. I have excluded female farm laborers from the United States calculation but have not for Latin America. Thus the percentage would be higher in Latin America than the 10% to 20% given, and more like the United States in the 1920s when it was slightly higher than 20%.

40. The percentage of all female workers who are clerical workers was 19% in Hong Kong and 26% in Singapore in 1980, but only 6% in Korea and 5% in the Philippines. The proportion of all clerical workers who are women was 51% in Hong Kong and 63% in Singapore, but 33% in Korea and 42% in the Philippines. Hong Kong and Korea also had female labor force participation rates for the 25 to 44 year old group that exceeded those for the 45 to 59 year old group of women, whereas in Korea the older group's participation rate is higher.

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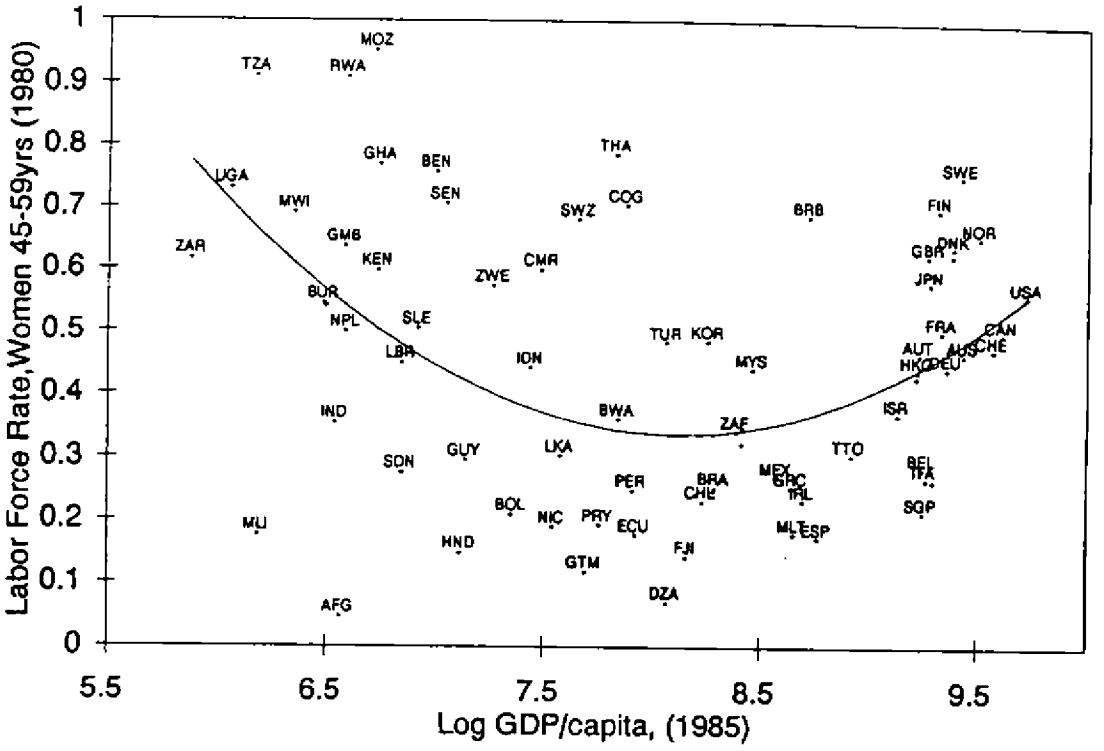

Figure 1: Labor force participation rates for women 45 to 59 years old (c. 1980) and the log of GDP/capita (1985, $1985)

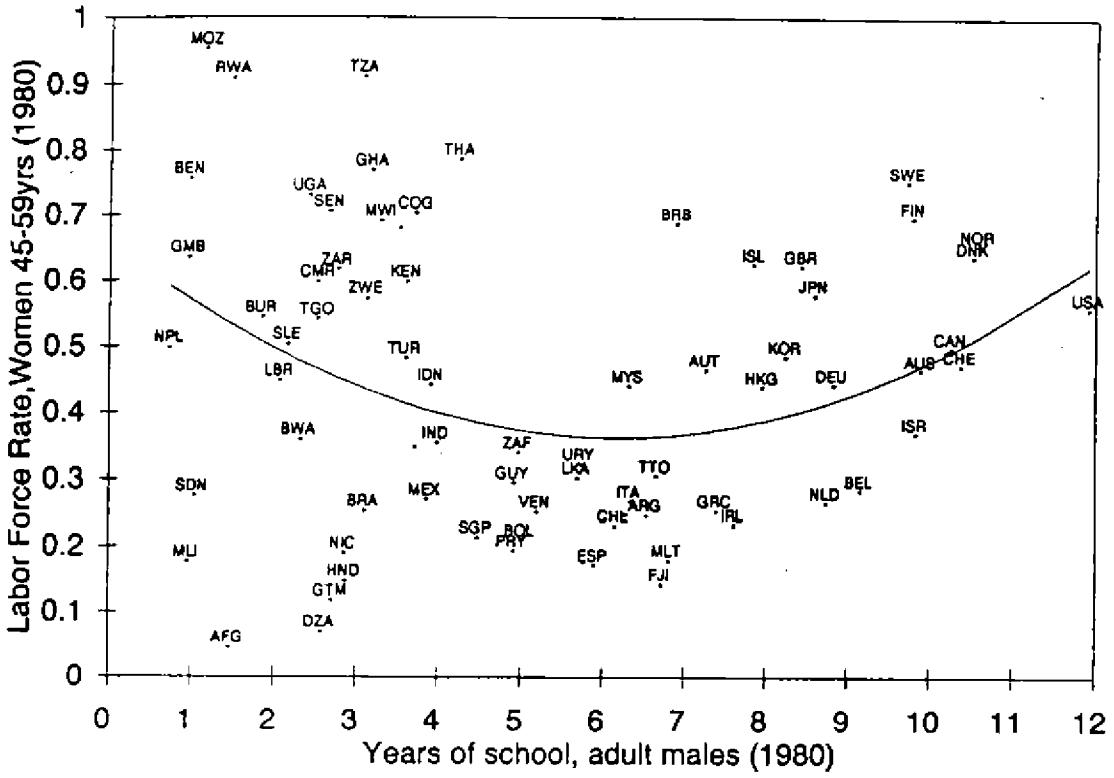

Figure 2: Labor force participation rates for women 45 to 59 years old and years of school for the adult (> 25 years) male population, both c. 1980

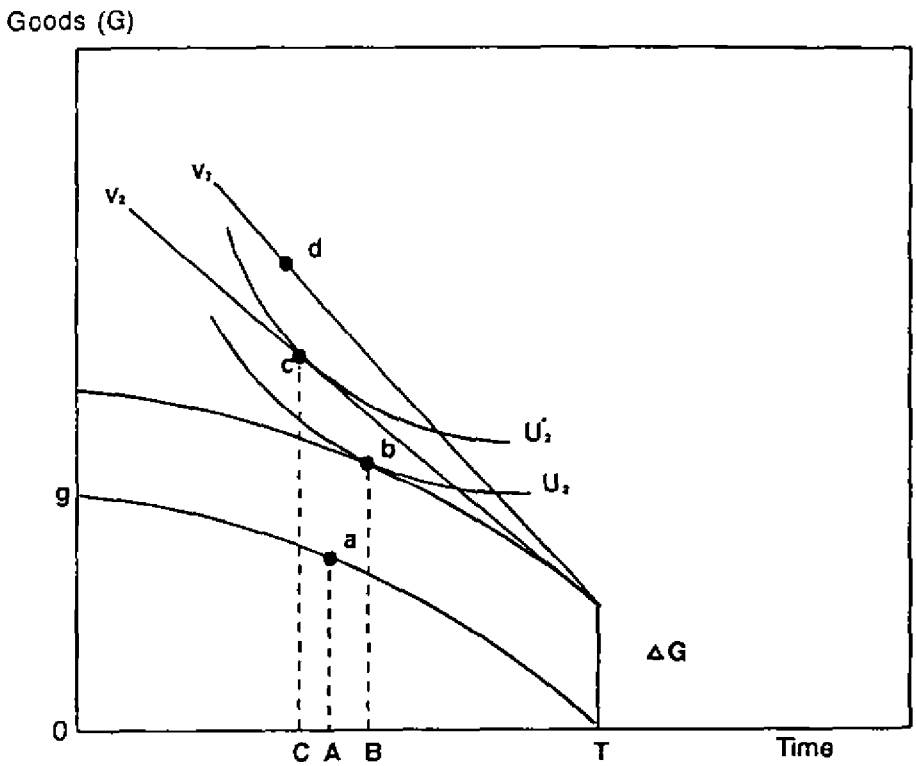

Figure 3: A model of household and market production with a non-stigma and a stigma equilibrium

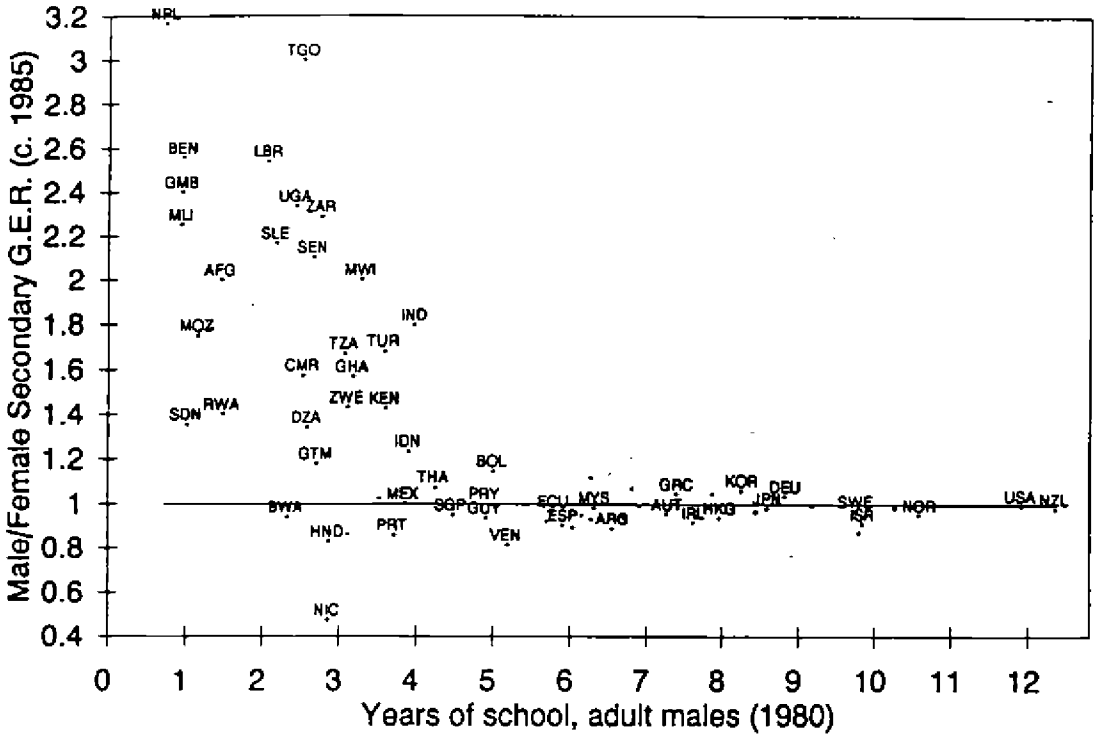

Figure 4: Ratio of male to female secondary school gross enrollment rates and years of school for the adult (> 25 years) male population, 1980s

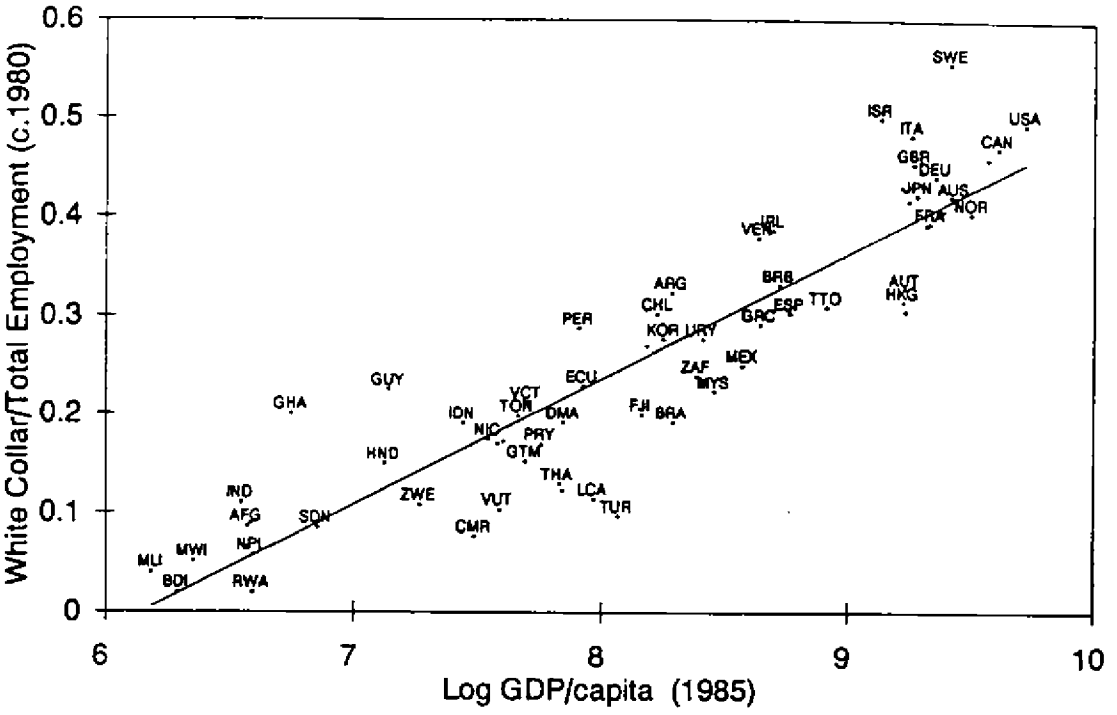

Figure 5: Fraction of total employment in white-collar occupations (c. 1980) and the log of GDP/capita (1985, $1985)

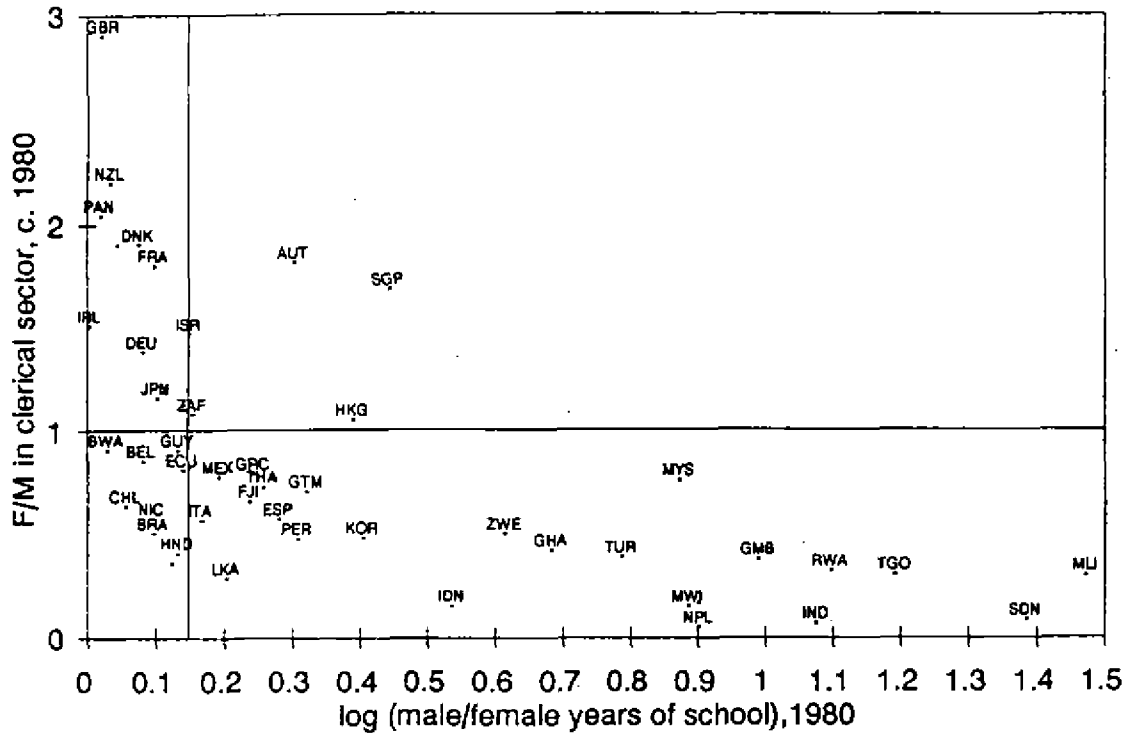

Figure 6: The ratio of female to male employment in the clerical sector and the log difference between total years of school for the male and female adult populations (> 25 years), c. 1980

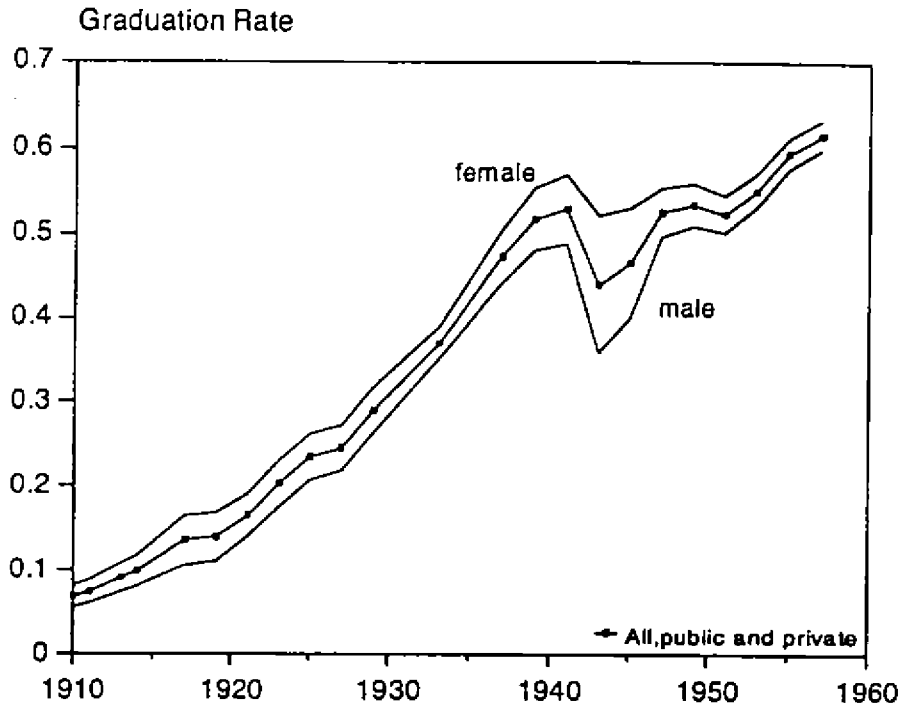

Figure 7: Male, female, and total high school graduation rates in the United States (non-South regions): 1910 to 1960

FIGURE SOURCES AND NOTES

Figure 1: Labor force participation rates for women 45 to 59 years old (c. 1980) and the log of GDP/capita (1985, $1985)

Sources: Labor force participation rates: United Nations (1992); GDP/capita in 1985: Summers and Heston (1991).

Notes: See Appendix 1 for the country codes; dots are given for countries that would have overlapped with others. The centrally-planned countries and those of the Middle East (except Israel) are omitted from the diagram. Also omitted are twenty countries for which the WISTAT (United Nations 1992) labor force data differ substantially from those given for employment status; see text. The regression line is a quadratic in the log of GDP/capita.

Figure 2: Labor force participation rates for women 45 to 59 years old and years of school for the adult (> 25 years) male population, both c. 1980

Sources: Labor force participation rates c. 1980: United Nations (1992); years of school for the adult (> 25 years) male population in 1980: Barro and Lee (1993).

Note: See Appendix 1 for the country codes; dots are given for countries that would have overlapped with others. The centrally-planned countries and those of the Middle East (except Israel) are omitted from the diagram. France has also been excluded because of definitional problems in measuring total years of education. Also omitted are twenty countries for which the WISTAT (United Nations 1992) labor force data differ substantially from those given for employment status, see text. The regression line is a quadratic in years of school.

Figure 4: Ratio of male to female secondary school gross enrollment rates and years of school for the adult (> 25 years) male population, 1980s

Sources: Male and female secondary school gross enrollment rates: United Nations (1990); years of school for the adult (> 25 years) male population: Barro and Lee (1993).

Notes: Years of school for the adult male population is for c. 1980. The latest year of gross enrollment rates from the source was used. It is generally between 1985 and 1988. See Appendix 1 for the country codes; dots are given for countries that would have overlapped with others. The centrally-planned countries and those of the Middle East (except Israel) are omitted from the diagram.

Figure 5: Fraction of total employment in white-collar occupations (c. 1980) and the log of GDP/capita (1985, $1985)

Sources: Occupational distribution: United Nations (1992); GDP/capita: Summers and Heston (1991).

Notes: White-collar occupations include those in the professional, managerial, clerical, and sales categories. The % in white-collar occupations is for c. 1980 unless data were unavailable in which case the latest date was used (often in the mid-1980s) or, if that were unavailable, the c. 1970 figure was used. About 25 cases did not have data for c. 1980. See Appendix 1 for the country codes; dots are given for countries that would have overlapped with others. The centrally-planned countries and those of the Middle East (except Israel) are omitted from the diagram.

Figure 6: The ratio of female to male employment in the clerical sector and the log difference between total years of school for the male and female adult populations (> 25 years), c. 1980

Sources: Occupational distribution: United Nations (1992); years of school for the adult (> 25 years) male population: Barro and Lee (1993).

Notes: The percentage in clerical occupations is for c. 1980 unless data were unavailable in which case the latest date was used (often in the mid-1980s) or, if that were unavailable, the c. 1970 figure was used. About 25 cases did not have data for c. 1980.

Five countries (AUS, CAN, FIN, NOR, USA) with ratios of female to male employment in the clerical sector > 3, one (AFG) with a log difference between male and female years of education > 1.5, and two countries (ARG, URY) with negative log differences have been excluded from the graph for reasons of clarity. See Appendix 1 for the country codes; dots are given for countries that would have overlapped with others. The centrally-planned countries and those of the Middle East (except Israel) are omitted from the diagram.

Figure 7: Male, female, and total high school graduation rates in the United States (non-South regions): 1910 to 1960

Source: U.S. Commissioner of Education (various years), see Goldin (1994)

Notes: Graduation rates are computed by dividing the number of graduates in a given year by the number of 17-year olds. Graduation rates include public and private schools to 1933. After 1933 the number in public schools is multiplied by 1.1. The figures do not yet correct for underreporting in the U.S. Commissioner of Education reports. They also do not yet include graduation from the preparatory departments of colleges and universities. Graduation from high school almost always meant completion of grade 12.

Table 1
Married Women's Labor Force Participation Rates:
The United States, 1890 to 1980

Year	White, All Ages	White, 25-34 Years	White, 45-54 Years
1890	2.5 [12.9][a]	2.6	2.3
1900	3.2	3.1	2.6
1910[b]	n.a.	n.a.	n.a.
1920	6.5	7.7	4.9[c]
1930	9.8	11.5	7.8
1940	12.5	16.7	10.1
1950	20.7	21.0	22.2
1960	29.8	26.7	38.6
1970	38.5	36.2	46.7
1980	49.3	56.0	53.4

[a] The figure in brackets is a revised estimate which includes various omitted categories, such as boardinghouse keepers and unpaid family farm laborers (both adjusted by hours of work), and manufacturing workers not included in the population census. It is likely that this figure is still an underestimate of a female labor force datum that would be consistent with that in 1940, when the construct changed from one of "gainful employment."

[b] Published data for the 1910 census are inconsistent with prior and subsequent data because of a change in the labor force question that led considerably more women on farms to listed an occupation.

[c] Includes married, white women 55-64.

Source: Goldin (1990), tables 2.1, 2.2, and 2.9.

Table 2
Female Clerical Employment in the United States, 1890 to 1950

Year	% in clerical sector of all female workers	% female of all clerical sector employment	% married of female clerical workers
1890	3.9	14.6	4.1
1900	6.3	24.0	3.7
1910	11.0	36.2	n.a.
1920	21.7	47.7	9.2
1930	22.7	51.5	18.7
1940	22.3	51.5	26.1
1950	27.6	62.1	41.5

Source: Goldin (1984), table 1.

Appendix 1: World Bank 3-Letter Country Codes

15 Letter Name	WB Code
Afghanistan	AFG
Angola	AGO
Albania	ALB
Algeria	DZA
Antigua and Bar	ATG
Argentina	ARG
Australia	AUS
Austria	AUT
Bahamas	BHS
Bahrain	BHR
Bangladesh	BGD
Barbados	BRB
Belgium	BEL
Belize	BLZ
Benin	BEN
Bhutan	BTN
Bolivia	BOL
Botswana	BWA
Brazil	BRA
Brunei Darussal	BRU
Bulgaria	BGR
Burkina Faso	HVO
Burundi	BDI
Cameroon	CMR
Canada	CAN
Cape Verde	CPV
Central African	CAF
Chad	TCD
Chile	CHL
China	CHN
Colombia	COL
Comoros	COM
Congo	COG
Costa Rica	CRI
Cote d'Ivoire	CIV
Cuba	CUB
Cyprus	CYP
Czechoslovakia	CSK
Denmark	DNK
Dominica	DMA
Dominican Repub	DOM
Ecuador	ECU
Egypt	EGY
El Salvador	SLV
Ethiopia	ETH
Fiji	FJI
Finland	FIN
France	FRA
Gabon	GAB
Gambia	GMB
Germany, Fed. R	DEU
Ghana	GHA
Greece	GRC
Grenada	GRD
Guatemala	GTM
Guinea-Bissau	GNB
Guinea	GIN
Guyana	GUY
Haiti	HTI
Honduras	HND
Hong Kong	HKG
Hungary	HUN
Iceland	ISL
India	IND
Indonesia	IDN
Iran (Islamic R	IRN
Iraq	IRQ
Ireland	IRL
Israel	ISR
Italy	ITA
Jamaica	JAM
Japan	JPN
Jordan	JOR
Kenya	KEN
Korea, Republic	KOR
Kuwait	KWT
Lebanon	LBN
Lesotho	LSO
Liberia	LBR
Libyan Arab Jam	LBY
Luxembourg	LUX
Madagascar	MDG
Malawi	MWI
Malaysia	MYS
Maldives	MDV
Mali	MLI
Malta	MLT
Mauritania	MRT
Mauritius	MUS
Mexico	MEX
Morocco	MAR
Mozambique	MOZ
Myanmar	BUR
Nepal	NPL
Netherlands Ant	ANT
Netherlands	NLD
New Zealand	NZL
Nicaragua	NIC
Niger	NER
Nigeria	NGA
Norway	NOR
Oman	OMN
Pakistan	PAK
Panama	PAN
Papua New Guine	PNG
Paraguay	PRY
Peru	PER
Philippines	PHL
Poland	POL
Portugal	PRT
Puerto Rico	PRI
Qatar	QAT
Romania	ROM
Rwanda	RWA
Saudi Arabia	SAU
Senegal	SEN
Seychelles	SYC
Sierra Leone	SLE

Singapore	SGP
Solomon Islands	SLB
Somalia	SOM
South Africa	ZAF
Spain	ESP
Sri Lanka	LKA
St. Lucia	LCA
St. Vincent/Gre	VCT
Sudan	SDN
Suriname	SUR
Swaziland	SWZ
Sweden	SWE
Switzerland	CHE
Syrian Arab Rep	SYR
Thailand	THA
Togo	TGO
Tonga	TON
Trinidad and To	TTO
Tunisia	TUN
Turkey	TUR
Uganda	UGA
United Arab Emi	ARE
United Rep. Tan	TZA
United Kingdom	GBR
United States	USA
Uruguay	URY
Vanuatu	VUT
Venezuela	VEN
Yemen	YEM
Yugoslavia	YUG
Zaire	ZAR
Zambia	ZMB
Zimbabwe	ZWE

Note: All countries, with known codes, are listed even if the countries are excluded from the analysis for various reasons.